

PERITONEAL TUBERCULOSIS.*

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IN 1889 I discovered accidentally that simple laparotomy might effect a cure in cases of tubercular peritonitis. I had a patient who presented an obscure abdominal condition and for purposes of diagnosis an exploratory laparotomy was performed. On opening the abdomen it was discovered that the patient suffered from tubercular peritonitis, principally involving the mesentery and the mesenteric glands. One gland was removed for microscopic examination and the abdomen was closed without further surgical interference. The case was regarded as hopeless, but from the time of operation the patient made a progressive and rapid improvement and became apparently completely well. He remained so for about two years, when the disease started afresh.

In a paper, entitled "The Influence of Laparotomy on Tuberculosis of the Peritoneum,"¹ read before the New York Surgical Society, in November, 1890, this case was reported and I also reviewed all the preceding literature on the subject, and set forth the various theories concerning this remarkable phenomenon. At that time there was no theory which seemed to explain the fact that laparotomy does effect a cure in a large percentage of cases. Up to that time there had been many cases recorded, but with few exceptions the operations had never been done for the purpose of affecting a cure of tubercular peritonitis, but they had been performed for the purpose of diagnosis or else under the mistaken idea that the surgeon was operating upon some other condition.

In 1890 Koenig had tabulated a set of 131 operations in

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this condition² and to Koenig belongs the credit of first advocating simple laparotomy as the proper surgical procedure in these cases. My paper, read in 1890, embraced the following conclusions:

1. That the danger of the operation is very slight; at present the death rate is but 3 per cent.
2. That sepsis is not so likely to occur in these peritonæa as in laparotomy in healthy ones, on account of the pathological changes which have taken place in the membranes.
3. That tubercular infection of the wound does not occur.
4. That disinfections are useless and that drainage should not be used, as it is likely to result in a permanent sinus.
5. That in unsuccessful cases the operation at best does no harm. Most of the patients who have died at a time remote from the operation, have succumbed to general tuberculosis or to tuberculosis of some other organ.
6. That established, not advanced pulmonary tuberculosis, is an indication for and not against the operation; for the improvement gained enables the patient to better resist the phthisis, and if this latter is but incipient, recovery may take place.
7. That laparotomy is the proper form of treatment for these cases. In some unknown way it exerts a most beneficial influence upon the disease, resulting in cure in a large proportion of cases and in a marked improvement in nearly all.

Nine years later, I carefully reviewed the subject and found that an immense amount of work had been done in this line, surgeons having eagerly taken up the procedure, but, notwithstanding the mass of clinical reports, practically nothing new had been added. There was still no satisfactory explanation of the phenomenon and nothing new of importance had been proposed in the way of treatment. Laparotomy was considered as the curative procedure by most surgeons and clinicians and as the preferable mode of treatment; but by the end of that decade a reaction set in, many becoming antagonistic to the surgical treatment of this malady, some claiming that more patients would get well under medical treatment than

after operation. Some went so far as to claim that laparotomy is never indicated in cases of tubercular peritonitis. One of the most notable publications in favor of the medical treatment and antagonistic to the surgical was that of Borehgrewink,³ in 1891.

In the same year Fenger⁴ wrote a review of the subject, quoting from Ticeky,⁵ Frank,⁶ Bottomley,⁷ and Borchgrewink.⁸

Fenger gave the views of the advocates and opponents of laparotomy and endeavored to reach some definite conclusions based upon a study of the literature and personal experience. His views seemed to accord with those of Borehgrewink, whom he quoted as follows: "That laparotomy is well tolerated in strong patients in whom fever is absent and their condition of nutrition good, speaks for a spontaneous disappearance of the tubercular process. Laparotomy, however, in patients with fever, when the tuberculosis has a progressive character, must diminish what slight power of resistance such a patient has remaining. This power of resistance may thus yield and death follow; or it may, by concurrence of fortunate circumstances, rebound and the patient recover in spite of the operation. That form of peritoneal tuberculosis which exists without fever, or with only slight fever, runs in itself a favorable course. In such cases laparotomy is unnecessary. In progressive tuberculosis the operation is dangerous and should be abandoned."

Borehgrewink based his conclusions on a study of 40 cases. Of 22 operative cases, 8 were light, 6 moderately severe and 8 severe. Fourteen, or 63.6 per cent., recovered, and 8, or 36.4 per cent., died. Of 17 patients treated without operation, 14, or 82 per cent., recovered and remained well for two or three years.

The publications of Borehgrewink and Fenger excited renewed interest in this subject and there were many important contributions resulting therefrom. The opinions and conclusions arrived at vary so much that there is an unfortunate lack of unanimity, and it is the object of this paper to place in review numerous contributions on the subject and to attempt

to formulate a consensus of opinion which may be a guide to the proper treatment of tubercular peritonitis.

Elestratov⁹ reviewed the statistics of a number of writers and found that 31.6 per cent. of 136 cases recovered under medical treatment and that 78.3 per cent. of 240 cases recovered after operation. He judged that the tubercular peritonitis which runs a stationary or chronic course, with little fever and with little or no ascites and but slight disturbance of nutrition, is capable of spontaneous and permanent recovery. On the other hand, when the original tubercular foci can be demonstrated in the mesenteric glands, intestines, or uterine appendages, he thinks that surgical intervention is urgently called for.

Shattuck¹⁰ analyzed the histories of 98 cases of tubercular peritonitis treated in the medical and surgical wards of Massachusetts Hospital from 1889 to 1900. Of 46 cases treated without operation, 7 died in the hospital, while of 52 surgical cases, 6 died in the hospital. The mortality at the time of discharge from the hospital was 13.2 per cent., while the mortality of the same series of cases, after a lapse of from two to eleven years, was 47.3 per cent. The ultimate mortality under medical treatment was 68 per cent. and under surgical treatment 37.5 per cent.

The therapeutic lessons derived from this analysis are as follows:

1. Tubercular peritonitis may be followed by apparently complete recovery, even if complicated by tuberculosis elsewhere, either under (a) purely medical treatment; (b) tapping; (c) incision.

2. As in other forms of internal tuberculosis, the best obtainable hygienic surroundings are all-important, consequently no patient should be kept in the hospital longer than is necessary, especially if more and better air can be secured outside, with proper care and food.

3. We are warranted in trying medical treatment for a time, especially under first-rate hygienic conditions, tapping the abdomen if there is sufficient fluid to cause discomfort.

4. If the patient under a month or six weeks of medical

treatment fails to improve, or in even less time, if he seems to be losing ground, surgical treatment should be advised.

Miles F. Porter¹¹ presented a paper on the study of the literature of the subject and a personal experience in the operative treatment of 12 cases. He does not ascribe recoveries to the operation alone, but believes the operation to have a decided curative effect. In his opinion, the ascitic form yields the best results and the ulcerating or caseating the worst. Porter suggests the exposure of the open peritoneal cavity to the actinic and X-rays.

Veit¹² reviewed the literature and expressed the view that tubercular peritonitis may get well spontaneously, even if not very frequently. He ascribes failure after operation in many instances to tuberculosis of other organs. He advises laparotomy without drainage in acute cases as soon as difficulties arise, and in chronic cases in which spontaneous recovery does not take place after a reasonable observation.

Thoenes¹³ reported 33 operative cases from Kümmel's clinic. Of 16 cases with ascites, 3 died, or 18.7 per cent.; 10 were discharged cured. (Three of these 10 were later operated upon for some other condition four, eight and eleven years after the original laparotomy, when no trace of tuberculosis was found.) Of the 3 cases remaining in the hospital, 2 recovered subsequently. Of 17 cases of the dry variety, 12 or 70.6 per cent., died, 3 were cured, and 2 improved. The ascitic variety shows the best results; laparotomy in the dry variety proved disastrous.

In a later article,¹⁴ Thoenes analyzed 80 cases from the Eppendorf Hospital and the surgical clinic of Göttingen. These cases were followed for some time after they left the hospital. His investigations established the fact that while a number of cases will recover under medical treatment, or without any treatment at all, there are many in which internal medication fails and subsequent laparotomy proves of decided value. He regards advanced complications of the lungs, larynx and intestines, as well as septic conditions, contraindications to operation. He believes that procedures such as the removal

of primary foci are only permissible when they can be done without the breaking up of dense adhesions. He compared the medical and surgical results in a collection of cases and found 48 per cent. of lasting cures in 82 cases treated medically, and 54 per cent. of lasting cures in 244 cases treated surgically. This would indicate that the results after medical treatment are not so good as those after operation and that one should resort to laparotomy without continuing medical treatment more than a few weeks, unless there should be marked benefit shown.

Schwarz¹⁶ reported 30 cases treated by laparotomy, of which 21, or 70 per cent., were cured. One case was well ten years after operation; 4 seven years after, 4 five years, and 7 three years after. None of the fatal cases died as the result of operation. In 4 cases he was able to demonstrate a cure at subsequent operations for some other conditions.

Dœrfler¹⁰ reported 32 cases. He employs conservative treatment as long as the amount of exudate does not threaten life, as long as there is but slight fever and as long as the general condition remains fair. He operates if there be hectic fever, if ascites increases, or if the patient is losing strength. He advises early operation in acute cases, associated with high or persistent fever. He tries aspiration first; if that fails, he performs laparotomy. He is in favor of drainage after laparotomy. He considers the ulcerating form hopeless.

Friedlander¹⁷ cannot believe that so serious and chronic a process as tuberculosis can be influenced by so short an intervention as laparotomy. He used statistics to prove that laparotomy favors the occurrence of faecal fistulae. He cautions against breaking up of adhesions, but advocates laparotomy in the presence of palpable undulating masses and uncysted collections of pus and stagnating secretions.

Fairchild¹⁸ advises laparotomy where an intra-abdominal focus is suspected or diagnosed. In the ascitic variety, he recommends laparotomy if the hygienic treatment has failed. In the fibrous form, he advocates the same. He considers laparotomy useless in the acute form with ascites and



high fever. Where there is much matting together of the intestines, he thinks laparotomy will be unsuecessful.

Guthrie¹⁹ reported 41 cases. Fourteen were operated on, with 7 deaths; 27 were treated medicinally, with only 4 deaths. He recommends tapping in chronic cases with ascites. He believes laparotomy beneficial only because it does away with the fluid.

Pagenstecher²⁰ advocates operation in the chronic stage and in those cases in which the uterine adnexa are the primary foci. He does not believe in operation in the dry variety and in the encapsulated form of the disease.

Rotch²¹ wrote a very important article with an analytical study of the cases which had occurred in the Children's and Infants' Hospital of Boston, Mass., during the eighteen years preceding. Rotch is in favor of operation. He feels that operation should not be done during the first year of infancy because then tubercular peritonitis is usually a part of a general miliary tuberculosis. He feels that the ascites shows a less advanced form and a more active process, which is favorable from a prognostic standpoint. He considers the fibrous form less favorable, especially if ascites is absent. In the ulcerative, caseous form, it is usually found that there is tuberculosis elsewhere, especially in the bronchial lymph glands and lungs, which acts as the primary focus of infection; hence these cases are not benefited by laparotomy. He would advise laparotomy in the primary form, even if the peritonitis is secondary to a mesenteric gland, which should be removed.

The following passages are well worthy of quotation:

"There have, of course, been cases of tubercular peritonitis which have recovered spontaneously, but the fact that this result can occur does not indicate, as has been suggested by some writers, that we should not operate, but should wait and see whether such spontaneous recovery would take place.

"The danger of localized tubercular peritonitis, which we know can get well, becoming disseminated and thus producing a general tuberculosis or a localized tuberculosis of the lung or brain, is undoubtedly a great one, and knowing that

if this dissemination does take place the child will in all probability die, it seems much more reasonable to operate before such dissemination has taken place, than to wait until it is too late. It is also well known that, first, in individual cases of localized tuberculosis, we are unable to say whether such cases will recover spontaneously or will become a general tuberculosis; and second, that an exploratory laparotomy, when performed by an expert, is known to be of little danger, especially in the earlier stages of the disease, when the child has not yet become markedly reduced in strength and vitality. Is it not better, then, to give the child the benefit of the chance, and when we are reasonably sure that tubercular peritonitis is present in a child over one year of age, and when there are no evident signs of tuberculosis elsewhere, or possibly only in the mesenteric lymph-nodes, is it not better to make an exploratory laparotomy at once?"

Zesas²² reviewed a long list of articles on the subject and reported two surgical cases of his own. He does not believe in waiting for spontaneous recovery, with all its uncertainties.

Ochsner²³ advocates drainage for laparotomy in the ascitic form. He cautions against breaking up adhesions and against rough manipulation of the tissues, particularly of the intestines. In the absence of the ascites, the diseased tissues may be removed, if the section is made through healthy tissue. He tabulated 32 cases treated in one hospital and later he recorded 8 more cases. From his experience, he drew the following conclusions:

1. In the absence of fluid, the diseased tissues can be removed with safety if the section is made in healthy tissues.
2. In the presence of ascites, remove it thoroughly and drain.
3. Avoid injuries of the peritoneum (abrasions).
4. Adhesions should not be disturbed.
5. The more gentle the handling of tissue, the better the results.
6. The diseased pelvic organs tolerate handling better than the intestines.

Eichberg²⁴ claims the percentage of recoveries for all ages without operation to be greater than with operation. He recognized the fact that cases with ascites form an exception, but he holds that these are cases which tend to spontaneous cure. In the discussion which followed, so eminent a clinician as Tyson of Philadelphia said, "To treat it medically is to temporize; in other words, that there is but one treatment that is likely to lead to satisfactory results and that is surgical."

Halstead of Chicago²⁵ advocated laparotomy in a majority of cases. Most of the cases cured by laparotomy he claims to be of the acute miliary form.

Köppen^{26 27} believes in operation when the exudate becomes troublesome and the general condition does not radically improve. He advises removal of the exudate by laparotomy and washing out the abdomen with a saline solution.

H. W. Freund²⁸ believes in conservative treatment for mild cases, but in surgical treatment for severe cases. He argued against the skepticism of Borelgrzewink, which he said experience has contradicted.

Sehraum²⁹ reported 45 cases in children. The operated cases showed the best result. He considers the prognosis best in the exudate form.

Murphy³⁰ in his classic article described four varieties of tubercular peritonitis, *i.e.*,

1. Disseminated, exudative, miliary, non-confluent, serous (ascitic) variety.

2. Nodular, ulcerative, or perforative (the least frequent variety).

3. Adhesive, fibroplastic, cystic, partition or obliterative variety.

4. Suppurative, circumscripted, or general mixed infection.

He recognizes four essential features in the treatment of peritoneal tuberculosis: First, to remove or shut off the source of supply of new tubercular debris; second, to remove the products of the infective process from the peritoneum; third, to increase the tissue proliferation for the encapsulation of the foci already present; fourth, to avoid mixed infection. He

says that all treatments which have availed have succeeded on these lines.

Murphy believes surgery to be a benefit in the disseminated serous, and in the nodular, ulcerating varieties, but in the adhesive variety, surgery is of little avail.

He lays special stress on the necessity of removing or shutting off from communication the original focus of the disease, as the fallopian tubes, vermiform appendix, etc.

McMurtry^{31 32} thinks in those cases of marked acuteness, characterized by high temperature and rapid pulse, both with and without effusion, operation generally fails to arrest the active progress of the disease. Nevertheless, the hopelessness character under any other form of treatment and the harmlessness of method under aseptic precautions, justifies, he believes, the operation in every case, especially if there is effusion and diagnosis is not absolutely positive. Thorough removal of the invaded structures is usually followed by permanent cure.

L. Miserochi³³ reported 14 cases cured by medical treatment alone. He had more cases, but mentioned only those in which the interval had been long enough to speak of a permanent cure. In 8 of his cases there was ascites. By the use of iodine internally and externally the ascites was absorbed and the palpated nodules retrogressed.

Charles H. Mayo,³⁴ and abstract,³⁵ removes the original lesion, leaving the peritoneal condition to cure itself. He closes the abdomen without drainage. He believes cases should be selected; in some patients the condition is such as to render operation extremely hazardous, as well as futile. In males the incision is made over the vermiform appendix; in women it is so arranged as to explore the pelvis. He reported 59 operations by the older method,—*i.e.*, without removing the original focus. Of these there were 42 cured, 15 improved, and 2 died. Of 58 operations for removal of tubercular tubes, there were 56 recoveries and 2 deaths. Of 27 cases of tubercular appendicitis (appendectomies) there was no death.

Sehömann³⁶ formerly did laparotomy in selected cases. Now he believes he gets better results by puncture and injection

of 5 per cent. glycerine emulsion of iodoform. He treated 7 cases and regarded them all as cured in the course of from three to ten weeks' treatment. Some of the patients required repeated injections.

Wm. J. Mayo³⁷ in his article "Surgical Tuberculosis in the Abdominal Cavity with Special Reference to Tubercular Peritonitis," reviewed post-mortem statistics, viz.: "In St. Mary's Hospital, Rochester, Minn., from October 1, 1894, to October 1, 1904, a period of ten years, there had been 6,408 abdominal operations performed. Of this number, 5,687 were intraperitoneal, and 184, or about 3 per cent., were for some variety of tuberculosis. Localized intestinal tuberculosis occurred 21 times; 13 cases were primary and 8 were uncertain."

He discussed the various forms of intestinal tuberculosis: "Tuberculous disease of the appendix we have found as a localized process 29 times, with no deaths, in 1,888 operations for appendicitis." . . . "Tuberculosis was found localized in the Fallopian tubes 44 times without tubercular peritonitis, the tubal lesions being securely walled off." . . . "In other words, between the ages of twenty and forty years, tubercular peritonitis is certainly very much more frequent in females and, so far as direct sources of infection are concerned, the tube is the one which may explain the difference in frequency. There were 89 cases of tubercular peritonitis, with 3 deaths."

"The clinic of this hospital is drawn largely from a fixed agricultural community and the majority of cases operated on who left the hospital improved, but failed to stay well, returned for further treatment. A considerable percentage did not maintain the improvement, and, in the course of years, patient after patient would return with relapse of the peritoneal condition or some other form of tuberculous infection. Some returned for further operation as many as four and five times. It became evident that, in a considerable percentage of cases there was some source of reinfection of the peritoneum after apparent cure."

"Having under observation a small number of patients in whom simple laparotomy had failed to permanently cure tubercular peritonitis, we began to do a radical operation, performing hysterectomy with removal of ovaries and tubes." He found this to be too radical because the uterus and ovaries showed no disease.

"By patience and care, we found it possible to enucleate tuberculous tubes in 26 cases of tuberculosis of the peritoneum. In practically all these cases the peritoneal involvement was the greatest in extent near the seat of local infection; this has been generally noted and heretofore ascribed to gravity. It is more likely to be due to proximity to the seat of infection."

"In many instances the region of the greatest distribution of tubercular peritoneal nodules could be shown near the appendix." "While simple abdominal incision and drainage has failed to cure all the cases, it did cure many and usually gave relief for a time, and if re-infection could be prevented, the cure might be expected to be permanent in a much larger number."

"Can we prevent relapse? Certainly we can in many instances. Of the 26 radical tubal operations we have made on cases of tuberculous peritonitis, 25 recovered; of these, 7 had been operated on by simple laparotomy from one to four times previously. In not a single patient as yet has another operation become necessary, and, as contrasted clinically with a preceding group of equal number, the favorable results are most striking."

"In tubercular peritonitis in women, we evacuate the fluid and then place the patient in the Trendelenberg position, packing off the general abdominal cavity in the usual manner. The pelvic organs, appendix and cæcum are examined. If the Fallopian tubes, appendix and cæcum are diseased they are removed." No drainage. In men, the incision is placed to the right of the median line over the appendix."

"The treatment of tubercular peritonitis should embrace not only the treatment of the peritonitis which is symptomatic, but the removal of the source of infection which, in the majority

of cases, will be found in the Fallopian tubes, appendix or intestine."

Göschel³⁸ in his experience found that about 23 per cent. of ascitic cases and only 10 per cent. of cases of adhesions were cured by operation; that children recovered spontaneously in about one-third of the milder uncomplicated cases. He advises that "laparotomy always helps, sometimes cures, and never harms."

F. F. Lawrence³⁹ advocates operation; he believes in drainage and thinks that the primary focus should be removed.

S. Lloyd⁴⁰ reported 21 cases. His experience and opinion formed from literature makes him feel that operation gives the best chance to the patient.

G. Faludi⁴¹ believes in laparotomy in the ulcero-caseous and fibro-adhesive varieties in children, and in the ascitic form, after hygienic and dietetic treatment have been tried without success; or in cases where it cannot be tried he believes the serious tubercular affection of other organs to be a contraindication.

D. MacCartney⁴² advocates laparotomy. In cases of doubt he insists on exploratory operation.

T. Guthrie⁴³ believes in laparotomy. In the ascitic form, he thinks aspiration may be of value in some cases. In the caseous and ulcerative form, operation is contraindicated and frequently in the adhesive form.

John B. Boucher⁴⁴ considered the etiology, pathology, diagnosis and treatment of the disease, and quoted Murphy as follows:

"The surgical treatment of tuberculosis of the peritoneum involves the following propositions: 1. To remove or shut off the source of supply to the peritoneum of new tuberculous debris. 2. To remove the products of the infective process from the peritoneum. 3. To increase the tissue proliferation for the encapsulation of the foci already present. 4. And to avoid mixed infection. Serous variety gives the best results. Dry and ulcerative variety is followed by high mortality and little is accomplished by surgery. In the localized suppurative

form, the operative result is quite favorable, while in the suppurative multilocular cystic variety but few recover."

The literature reviewed above practically embraces the reports of all the work which has been done in this field of medicine during the period of modern surgery. There has been a vast amount of clinical work and scientific research, but some phases of the question stand exactly as they did when I wrote my first paper on this subject in 1889. To-day it is as true as ever that laparotomy *per se* will effect a cure in certain cases of tubercular peritonitis; that is to say, this cure is brought about by merely opening and closing the abdominal wall; and to-day we are as ignorant of the reason why this remarkable phenomenon takes place as we were when it was first discovered and demonstrated. On the other hand, much has been learned in the last ten years of the rationale of the treatment of tubercular peritonitis. For instance, we have learned that operations should not be undertaken during the first year of infancy; we have learned that surgery offers but little hope in the adhesive variety of the disease; we have learned that the serous variety offers the best prognosis under the various forms of treatment and that the surgical treatment of this variety offers the best results obtainable in this disease, but the most important lesson we have learned is that the scientific operation of to-day is the one which has for its foundation the removal of the original focus of the disease, as tubercular Fallopian tubes, vermiform appendix, mesenteric gland, etc. Perhaps William Mayo has made this clearer than any of the contributors to this subject when he detailed a number of cases in which repeated operations had been done under the older method, recurrence taking place and finally laparotomies had been performed, with removal of the original foci, and the patients have remained well.

The skepticism toward the surgical treatment of this disease, as particularly championed by Borchgrevink, has not prevailed. Statistics have proved that cases treated by operation have done better than similar series of cases treated without operation. On the other hand, much has been added to our

knowledge of the disease by the writings and thoughts of these men. We realize the importance of hygienic treatment; we realize the impropriety of operating on all cases of tubercular peritonitis; we realize that laparotomy should not be performed when the peritoneal trouble is only one phase of a more or less general tuberculosis.

Before closing, I wish to thank my colleague, Dr. Henry Roth, for he rendered me the greatest assistance in compiling and analyzing the voluminous literature on this subject.

If the next few years shall add as much to our knowledge of this subject as was learned during the last decade, it will certainly be a great blessing to humanity, for we may look forward to a constant improvement in the results of treatment in this serious malady.

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